

17<sup>th</sup> May 2016

Team Leader – Air Quality  
 Auckland Council  
 Private Bag 92 300  
 Auckland 1142

Dear Team Leader – Air Quality

**Re: Investigation of Total Suspended Particulate Trigger at Three Kings Quarry**

With regard to condition 21 of the Three Kings Quarry Air Discharge Consent (Permit Number 40041), this is to confirm that a result greater than  $60\mu\text{g}/\text{m}^3$  as a 24 hour average was recorded by the Southern Boundary BAM unit on the 4<sup>th</sup> May 2016.

The trigger is as follows:

- 4 May 2016 –  $80.2\mu\text{g}/\text{m}^3$  at the BAM monitor located at the Southern Boundary of the site.

As required by condition 21 of the Air Discharge Permit, an investigation has been undertaken. This letter details the results and conclusions of the investigation.

Air quality monitoring at Three Kings Quarry consists of:

- Two Beta Attenuation Monitors (BAM) units. These units are located at the Office and the Southern Boundary.
- A meteorological monitoring station located at the site offices that records wind speed, wind direction and rainfall on a continuous basis.
- Video cameras that monitor the site from the north and south.
- Visual inspections of air quality carried out by site staff.
- Recording of dust suppression equipment use and malfunctions.

All relevant air quality monitoring results collected on the day of the trigger have been summarised in Table 1.

**Table 1: Air Quality Monitoring Results**

Date	04/05/2016
BAM - Office ( $\mu\text{g}/\text{m}^3$ )	21.2
BAM – Southern Boundary ( $\mu\text{g}/\text{m}^3$ )	80.2
Daily Rainfall (mm)	0.0
Daily Average Wind Speed (m/s)	1.924
Daily Average Wind Direction (degrees)	139.021
Sprinklers Operational? (yes/no)	Yes
Video Monitors Operational (yes/no)	Yes
BAM Text Alarm Received (yes/no)	Yes – a number were received and responded to between 08:00 and 18:00

#### Investigation of the Trigger:

- The daily average wind speed on the day of the trigger was recorded as 1.924m/s which was slightly lower than the 2.196m/s average daily wind speed for the previous month of April 2016.
- There was no rainfall recorded on the day of the trigger or the two days prior.
- The daily average wind direction for the two days prior to the exceedance were 232.8° and 253.0°, respectively. Records show that the wind direction changed significantly at approximately 08:00am on the day of the trigger, resulting in a daily average wind direction of 139.0° for the 4<sup>th</sup> May 2016.
- The BAM monitor at the Southern Boundary was the only unit to record a value over 60µg/m<sup>3</sup> as a 24 hour average. The BAM monitor located at the Office recorded 21.2µg/m<sup>3</sup> as a 24 hour average for the same day.
- The sprinkler system and water cart were fully operational on the day of the exceedance.
- The BAM monitors are currently set to send out text messages to the Site Manager, Supervisor and Environmental Fill Specialist at levels which provide an early warning of potential dust issues if action is not taken. A number of text messages were received starting from approximately 08:00 until 18:00. Upon receipt of the first alarm at 8:00am, the site was investigated and it was noted that:
  - There was a very heavy layer of fog overlying the Quarry and beyond the boundary.
  - A lime stabilisation trial was being conducted in the South-eastern corner of the site. This operation involved the spreading of fine lime chip over the southern portion of the placed fill using a tractor towed Sand Spreader.
  - The sprinkler system and water cart were fully operational.
- Video monitors of the site have been reviewed and there are no specific areas or activities observed within Three Kings Quarry that were significant generators of dust on the day of the trigger with the exception of the lime stabilisation trial conducted between 07:00-08:00am in the South-eastern portion of the site.
- The dust log also contains an entry on the 4<sup>th</sup> May 2016 which states that significant dust and fumes were visible coming from the extractor vents of the adjacent Danske Mobler building and blowing across the Three Kings Quarry site. This is an ongoing occurrence which has been recorded on eight separate days throughout April 2016 and the day prior to the exceedance. There is the potential that the dust emitted from Danske Mobler increased the ambient dust, elevating the results from that solely sourced from fill activities.
- Cause of Trigger and Corrective Actions:

The investigation conducted into the result of 80.2µg/m<sup>3</sup> as a 24 hour average recorded at the Southern Boundary BAM monitor on the 4<sup>th</sup> May 2016 concluded two potential sources:

- Lime stabilisation trial which occurred on site between 07:00 – 08:00am

- Fumes and dust emitted from the extractor vents of the adjacent Danske Mobler building throughout the day

The first text alert received from the Southern Boundary BAM unit was at 08:00am on the day of the trigger exceedance. At that time the quarry was blanketed in a very heavy fog which made it difficult to identify the source responsible for the alert. It was decided that the lime stabilisation trial which began at 07:00am in the South-Eastern portion of the site was a potential contributing factor, therefore this activity was stopped immediately.

Visible fumes and dust were observed coming from the extractor vents of the adjacent Danske Mobler building and blowing across the Three Kings Quarry site. It is considered that this attributed to alerts received throughout the day at the Southern Boundary BAM unit.

We consider that the additional measures taken on the day (immediate investigation and action) though did not prevent a trigger, certainly managed the degree of exceedance and effect as best as practicable.

Closing:

No complaints to date have been received as a result of this exceedance.

The spreading of lime will not occur in the future until a satisfactory application method is put in place.

Three Kings Quarry staff will continue to record visible dust and fumes emitted from the Danske Mobler site on the Daily Dust Log Field sheet along with any dust generating activities within the quarry.

With the ongoing daily practices being implemented, we are confident that we can continue to manage the site to minimise the occurrence of such triggers.

If there are any further queries or comments on this investigation please do not hesitate to contact me on 027 504 3624 or at [angela.klein@gbcwinstone.co.nz](mailto:angela.klein@gbcwinstone.co.nz)

Yours faithfully



Angela Klein

**Environmental Fill Specialist**